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CITRUS CHEMICAL USAGE

August 2000

FRUIT AND NUT CHEMICAL USAGE SURVEY METHODOLOGY

Primary data used in making chemical use estimates were obtained from a probability survey conducted in the fall of 1999. Florida fruit producers were stratified by size of operation and also by type of fruit produced. Larger operations had an increased chance of being selected for the survey.

Enumeration was by personal interview. A sample of 604 fruit producers was contacted during the enumeration period. A full year of chemical application data was collected dealing with the 1998-99 crop year. Data were collected for bearing acres only.

A thorough review compared reported data with manufacturer's label recommendations and with data from other fruit producers. Following this review, product information was converted to an active ingredient level. The chemical usage reported in this publication consists of survey estimates of those active ingredients.

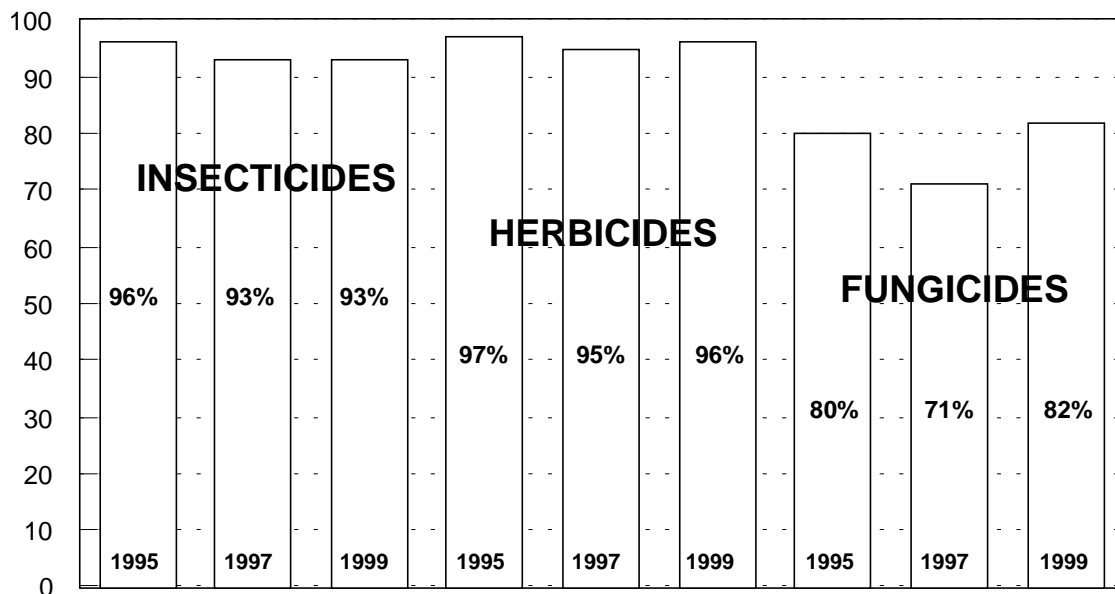
On a nation-wide scale, 14 States conducted Chemical Use surveys. Each of the 14 States focused on the major fruit and nut crops grown in that State. In Florida, the crops surveyed were oranges, grapefruit, tangerines, tangelos, temples, avocados, pecans, and limes.

FLORIDA SUMMARY

As depicted in the graph below, herbicides were used on more acres in 1999 than any other class of pesticide. Herbicides were used on 96.3 percent of the 782,900 bearing acres of citrus and avocados in Florida. Insecticides were used on 93.1 percent of the bearing acres. Fungicides were used on 81.9 percent of the bearing acreage.

The following tables list, by crop, the area treated, number of applications, rate per acre per application, and rate per crop year per acre for 1995, 1997, and 1999.

PESTICIDE USE, FLORIDA PERCENT COVERAGE BY PESTICIDE CLASS



1995 TARGET CITRUS AND AVOCADO BEARING ACRES (746,300)
1997 TARGET CITRUS AND AVOCADO BEARING ACRES (820,400)
1999 TARGET CITRUS AND AVOCADO BEARING ACRES (782,900)

ORANGES: Major Chemical Usage, 1995, 1997, and 1999 Florida

| | 1995 (562,800 acres) | | | | 1997 (624,900 acres) | | | | 1999 (612,600 acres) | | | |
|----------------------|----------------------|---------------|-----------------------|--------------------|---|---------------|-----------------------|--------------------|----------------------|---------------|-----------------------|--------------------|
| Chemical | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | | | | | | | | |
| Nitrogen | 100 | 5.0 | 35 | 179 | Fertilizer data were not included in the 1997 survey. | | | | 94 | 4.6 | 46 | 215 |
| Phosphate | 62 | 5.2 | 8 | 42 | | | | | 71 | 3.1 | 23 | 73 |
| Potash | 98 | 4.9 | 37 | 182 | | | | | 94 | 4.3 | 49 | 213 |
| Herbicides | | | | | | | | | | | | |
| Bromacil | 33 | 1.7 | 1.18 | 2.03 | 45 | 1.5 | 0.77 | 1.13 | 25 | 1.6 | 0.68 | 1.11 |
| Diuron | 65 | 1.7 | 1.11 | 1.86 | 61 | 1.8 | 0.83 | 1.47 | 54 | 1.7 | 1.25 | 2.17 |
| Glyphosate | 85 | 2.5 | 0.73 | 1.84 | 73 | 2.3 | 0.74 | 1.73 | 83 | 2.0 | 0.98 | 2.04 |
| Norflurazon | 22 | 1.6 | 1.30 | 2.10 | 25 | 1.8 | 1.03 | 1.84 | 22 | 1.5 | 1.54 | 2.41 |
| Paraquat | 7 | 1.3 | 0.31 | 0.41 | 6 | 2.2 | 0.28 | 0.62 | 13 | 2.0 | 0.34 | 0.67 |
| Sethoxydim | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 5 | 1.6 | 0.15 | 0.24 |
| Simazine | 22 | 1.3 | 1.90 | 2.53 | 24 | 1.5 | 1.43 | 2.11 | 40 | 1.7 | 1.71 | 2.94 |
| Sulfosate | 1/ | 1/ | 1/ | 1/ | 3 | 2.7 | 0.76 | 2.08 | 15 | 1.2 | 1.04 | 1.34 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 49 | 1.4 | 0.01 | 0.01 | 35 | 1.4 | 0.008 | 0.01 | 36 | 1.3 | 0.007 | 0.009 |
| Aldicarb | 10 | 1.0 | 2.54 | 2.54 | 7 | 1.0 | 3.23 | 3.23 | 10 | 1.1 | 2.53 | 2.83 |
| Carbaryl | 1/ | 1/ | 1/ | 1/ | 2 | 1.3 | 1.65 | 2.16 | 2 | 1.6 | 1.41 | 2.31 |
| Chlorpyrifos | 7 | 1.6 | 1.07 | 1.73 | 5 | 2.2 | 0.57 | 1.28 | 1/ | 1/ | 1/ | 1/ |
| Diflubenzuron | 1/ | 1/ | 1/ | 1/ | 3 | 1.2 | 0.37 | 0.45 | 7 | 1.0 | 0.31 | 0.34 |
| Ethion | 17 | 1.2 | 2.42 | 2.96 | 15 | 1.2 | 2.44 | 3.00 | 1/ | 1/ | 1/ | 1/ |
| Fenbutatin-oxide | 7 | 1.1 | 1.14 | 1.29 | 7 | 1.1 | 0.91 | 1.04 | 21 | 1.0 | 1.00 | 1.03 |
| Petroleum distillate | 92 | 1.9 | 36.25 | 68.99 | 88 | 2.6 | 28.86 | 74.67 | 93 | 1.9 | 35.41 | 70.50 |
| Sulfur | 10 | 1.3 | 16.54 | 21.56 | 11 | 1.3 | 13.17 | 17.26 | 19 | 1.0 | 10.31 | 10.61 |
| Fungicides | | | | | | | | | | | | |
| Basic copper sulfate | 13 | 1.6 | 3.26 | 5.07 | 16 | 1.9 | 2.27 | 4.34 | 7 | 1.3 | 0.97 | 1.26 |
| Benomyl | 6 | 1.4 | 0.83 | 1.15 | 3 | 1.1 | 0.75 | 0.79 | 6 | 1.1 | 0.69 | 0.77 |
| Copper hydroxide | 47 | 1.7 | 2.18 | 3.60 | 41 | 1.9 | 1.90 | 3.68 | 38 | 1.4 | 2.15 | 3.02 |
| Copper oxychlo sul | 2 | 1.8 | 4.18 | 7.42 | 1/ | 1/ | 1/ | 1/ | 12 | 2.8 | 2.67 | 7.51 |
| Ferbam | 1/ | 1/ | 1/ | 1/ | 1 | 1.1 | 6.88 | 7.49 | 10 | 1.1 | 1.96 | 2.31 |
| Fosetyl-al | 3 | 1.3 | 3.14 | 4.22 | 2 | 1.6 | 2.67 | 4.18 | 2 | 1.1 | 3.18 | 3.60 |
| Metalaxyl | 4 | 1.8 | 0.38 | 0.69 | 1 | 1.4 | 0.57 | 0.82 | 1/ | 1/ | 1/ | 1/ |

1/ Insufficient reports to publish.

GRAPEFRUIT: Major Chemical Usage, 1995, 1997, and 1999 Florida

| Chemical | 1995 (127,300 acres) | | | | 1997 (139,200 acres) | | | | 1999 (116,600 acres) | | | |
|----------------------|----------------------|---------------|-----------------------|--------------------|---|---------------|------------------------|--------------------|----------------------|---------------|-----------------------|--------------------|
| | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cat-ion | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | | | | | | | | |
| Nitrogen | 98 | 2.7 | 48 | 132 | Fertilizer data were not included in 1997 survey. | | | | 96 | 2.8 | 56 | 160 |
| Phosphate | 80 | 2.2 | 25 | 54 | | | | | 54 | 2.3 | 29 | 68 |
| Potash | 98 | 2.6 | 57 | 147 | | | | | 91 | 2.6 | 65 | 170 |
| Herbicides | | | | | | | | | | | | |
| Bromacil | 18 | 1.4 | 0.99 | 1.38 | 30 | 1.3 | 0.83 | 1.10 | 1/ | 1/ | 1/ | 1/ |
| Diuron | 30 | 1.4 | 0.90 | 1.30 | 52 | 1.3 | 0.95 | 1.26 | 34 | 1.7 | 1.35 | 2.29 |
| Glyphosate | 91 | 2.7 | 0.86 | 2.31 | 91 | 2.2 | 0.79 | 1.74 | 90 | 2.2 | 0.99 | 2.26 |
| Norflurazon | 32 | 1.4 | 1.76 | 2.41 | 17 | 1.4 | 1.12 | 1.54 | 22 | 1.9 | 1.39 | 2.76 |
| Oryzalin | 20 | 1.1 | 1.81 | 1.95 | 4 | 1.4 | 1.48 | 2.02 | 1/ | 1/ | 1/ | 1/ |
| Paraquat | 2 | 2.2 | 0.35 | 0.75 | 3 | 1.4 | 0.38 | 0.52 | 1/ | 1/ | 1/ | 1/ |
| Simazine | 28 | 1.1 | 2.15 | 2.38 | 34 | 1.5 | 1.16 | 1.71 | 48 | 2.5 | 1.56 | 4.02 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 83 | 1.7 | 0.01 | 0.01 | 65 | 1.3 | 0.009 | 0.01 | 78 | 1.0 | 0.01 | 0.01 |
| Aldicarb | 12 | 1.0 | 2.58 | 2.58 | 8 | 1.0 | 3.70 | 3.70 | 7 | 1.0 | 4.18 | 4.19 |
| Chlorpyrifos | 18 | 1.2 | 1.61 | 1.89 | 5 | 1.5 | 1.88 | 2.88 | 1/ | 1/ | 1/ | 1/ |
| Diflubenzuron | 1/ | 1/ | 1/ | 1/ | 5 | 2.7 | 0.35 | 0.95 | 10 | 1.0 | 0.30 | 0.31 |
| Ethion | 40 | 1.3 | 2.69 | 3.45 | 33 | 1.1 | 2.66 | 2.92 | 1/ | 1/ | 1/ | 1/ |
| Fenbutatin-oxide | 21 | 1.0 | 0.86 | 0.86 | 13 | 1.3 | 0.88 | 1.11 | 38 | 1.0 | 0.99 | 0.99 |
| Petroleum distillate | 93 | 2.7 | 25.55 | 68.10 | 89 | 2.3 | 31.56 | 72.24 | 89 | 1.5 | 35.61 | 53.36 |
| Pyridaben | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 8 | 1.0 | 0.26 | 0.26 |
| Sulfur | 19 | 1.8 | 17.31 | 30.55 | 35 | 1.4 | 15.40 | 21.86 | 58 | 1.0 | 11.70 | 12.49 |
| Fungicides | | | | | | | | | | | | |
| Basic copper sulfate | 9 | 1.4 | 6.16 | 8.90 | 7 | 1.7 | 2.54 | 4.27 | 7 | 1.2 | 1.65 | 2.09 |
| Benomyl | 5 | 1.1 | 0.87 | 0.93 | 12 | 1.0 | 1.08 | 1.08 | 9 | 1.0 | 1.23 | 1.26 |
| Copper hydroxide | 71 | 3.3 | 3.08 | 10.27 | 59 | 3.1 | 2.98 | 9.35 | 38 | 2.2 | 2.38 | 5.28 |
| Ferbam | 1/ | 1/ | 1/ | 1/ | 2 | 1.3 | 8.47 | 11.33 | 7 | 2.6 | 7.70 | 20.40 |

^{1/} Insufficient reports to publish.

TANGELOS: Major Chemical Usage, 1995, 1997, and 1999 Florida

| Chemical | 1995 (12,400 acres) | | | | 1997 (13,300 acres) | | | | 1999 (11,700 acres) | | | |
|----------------------|---------------------|---------------|-----------------------|--------------------|---|---------------|-----------------------|--------------------|---------------------|---------------|-----------------------|--------------------|
| | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | Fertilizer data were not included in 1997 survey. | | | | | | | |
| Nitrogen | 99 | 3.3 | 52 | 170 | | | | | 99 | 2.9 | 56 | 165 |
| Phosphate | 69 | 2.5 | 26 | 65 | | | | | 70 | 2.6 | 10 | 27 |
| Potash | 99 | 3.1 | 55 | 172 | | | | | 99 | 2.9 | 60 | 175 |
| Herbicides | | | | | | | | | | | | |
| Bromacil | 18 | 1.5 | 1.03 | 1.57 | 22 | 1.8 | 1.36 | 2.47 | 2 | 1.5 | 0.97 | 1.49 |
| Diuron | 41 | 1.8 | 0.96 | 1.71 | 61 | 1.5 | 1.25 | 1.90 | 53 | 2.2 | 1.58 | 3.53 |
| Glyphosate | 97 | 2.6 | 0.81 | 2.09 | 95 | 2.7 | 0.84 | 2.22 | 94 | 2.0 | 0.87 | 1.80 |
| Norflurazon | 18 | 1.7 | 1.16 | 2.00 | 19 | 1.5 | 1.66 | 2.54 | 47 | 1.4 | 1.26 | 1.77 |
| Paraquat | 1/ | 1/ | 1/ | 1/ | 5 | 1.9 | 0.35 | 0.66 | 28 | 1.9 | 0.28 | 0.54 |
| Simazine | 23 | 1.4 | 1.84 | 2.64 | 48 | 1.2 | 1.13 | 1.34 | 35 | 2.3 | 1.50 | 3.45 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 64 | 1.4 | 0.01 | 0.01 | 79 | 2.4 | 0.009 | 0.02 | 59 | 1.1 | 0.009 | 0.01 |
| Chlorpyrifos | 1/ | 1/ | 1/ | 1/ | 6 | 1.5 | 0.76 | 1.18 | 5 | 1.2 | 1.01 | 1.25 |
| Dicofol | 8 | 1.0 | 2.11 | 2.13 | 1/ | 1/ | 1/ | 1/ | 2 | 1.2 | 1.66 | 1.99 |
| Diplubanzuron | 1/ | 1/ | 1/ | 1/ | 9 | 1.2 | 0.32 | 0.37 | 14 | 1.1 | 0.29 | 0.32 |
| Ethion | 32 | 1.4 | 2.50 | 3.42 | 16 | 1.2 | 2.70 | 3.12 | 35 | 1.0 | 5.39 | 5.50 |
| Fenbutatin-oxide | 23 | 1.0 | 0.86 | 0.86 | 6 | 1.1 | 1.20 | 1.30 | 25 | 1.0 | 0.98 | 1.00 |
| Petroleum distillate | 93 | 2.1 | 31.06 | 65.29 | 94 | 2.4 | 36.47 | 88.72 | 95 | 1.5 | 39.83 | 63.32 |
| Sulfur | 12 | 1.5 | 15.63 | 23.89 | 9 | 1.3 | 16.33 | 20.60 | 1/ | 1/ | 1/ | 1/ |
| Fungicides | | | | | | | | | | | | |
| Basic copper sulfate | 13 | 1.3 | 4.39 | 5.69 | 4 | 1.1 | 4.13 | 4.51 | 6 | 1.5 | 2.06 | 3.20 |
| Benomyl | 1/ | 1/ | 1/ | 1/ | 9 | 1.3 | 0.90 | 1.19 | 3 | 1.5 | 0.39 | 0.59 |
| Copper hydroxide | 65 | 2.6 | 2.71 | 6.92 | 87 | 3.6 | 2.73 | 9.84 | 56 | 1.3 | 2.25 | 3.11 |
| Iprodione | 6 | 1.6 | 1.47 | 2.32 | 27 | 2.2 | 1.03 | 2.29 | 1/ | 1/ | 1/ | 1/ |
| Copper oxychlo Sul. | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 25 | 1.9 | 2.81 | 5.58 |
| Other Chemical | | | | | | | | | | | | |
| Gibberellic Acid | 8 | 1.0 | 0.04 | 0.04 | 26 | 1.0 | 0.10 | 0.11 | 1/ | 1/ | 1/ | 1/ |

1/ Insufficient reports to publish.

LIMES: Major Chemical Usage, 1995, 1997 and 1999 Florida 1/

| Chemical | 1995 (1,900 acres) | | | | 1997 (2,100 acres) | | | | 1999 (2,700 acres) | | | |
|----------------------|--------------------|---------------|-----------------------|--------------------|---|---------------|-----------------------|--------------------|--------------------|---------------|-----------------------|--------------------|
| | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | Fertilizer data were not included in the 1997 survey. | | | | | | | |
| Nitrogen | 92 | 2.9 | 51 | 149 | | | | | 100 | 5.5 | 54 | 301 |
| Phosphate | 61 | 3.4 | 18 | 61 | | | | | 100 | 2.9 | 18 | 54 |
| Potash | 92 | 2.9 | 55 | 160 | | | | | 100 | 4.4 | 68 | 303 |
| Herbicides | | | | | | | | | | | | |
| Glyphosate | 1/ | 1/ | 1/ | 1/ | 98 | 6.2 | 0.65 | 4.06 | 42 | 5.0 | 0.75 | 3.73 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 26 | 4.5 | 0.01 | 0.03 | 95 | 1.2 | 0.003 | 0.004 | 89 | 1.1 | 0.009 | 0.01 |
| Ethion | 42 | 1.9 | 1.67 | 3.24 | 98 | 1.5 | 2.12 | 3.11 | 56 | 2.3 | 2.75 | 6.49 |
| Petroleum distillate | 73 | 3.7 | 19.99 | 73.61 | 100 | 1.5 | 20.14 | 30.92 | 80 | 3.8 | 15.40 | 58.95 |
| Fungicides | | | | | | | | | | | | |
| Copper hydroxide | 96 | 5.5 | 4.16 | 22.88 | 98 | 1.5 | 5.50 | 8.26 | 87 | 3.2 | 4.07 | 13.34 |

1/ Insufficient reports to publish.

TANGERINES: Major Chemical Usage, 1995, 1997, and 1999 Florida

| | 1995 (20,100 acres) | | | | 1997 (28,500 acres) | | | | 1999 (27,300 acres) | | | |
|----------------------|---------------------|---------------|-----------------------|--------------------|---|---------------|-----------------------|--------------------|---------------------|---------------|-----------------------|--------------------|
| Chemical | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | Fertilizer data were not included in the 1997 survey. | | | | | | | |
| Nitrogen | 98 | 3.0 | 64 | 191 | | | | | 99 | 4.3 | 41 | 178 |
| Phosphate | 76 | 2.5 | 13 | 33 | | | | | 55 | 3.1 | 9 | 28 |
| Potash | 98 | 2.9 | 68 | 197 | | | | | 98 | 3.8 | 47 | 183 |
| Herbicides | | | | | | | | | | | | |
| Bromacil | 21 | 1.4 | 0.91 | 1.29 | 21 | 1.9 | 0.82 | 1.55 | 16 | 1.4 | 0.76 | 1.11 |
| Diuron | 44 | 1.5 | 1.13 | 1.67 | 60 | 1.5 | 1.05 | 1.58 | 39 | 1.6 | 1.16 | 1.85 |
| Glyphosate | 82 | 2.3 | 0.73 | 1.63 | 92 | 2.0 | 0.79 | 1.61 | 93 | 2.3 | 0.84 | 1.97 |
| Norflurazon | 21 | 1.9 | 1.59 | 2.97 | 37 | 1.3 | 1.21 | 1.55 | 14 | 1.6 | 1.11 | 1.80 |
| Paraquat | 1/ | 1/ | 1/ | 1/ | 5 | 1.8 | 0.34 | 0.61 | 5 | 1.5 | 0.29 | 0.46 |
| Simazine | 22 | 1.3 | 1.80 | 2.26 | 40 | 1.2 | 1.21 | 1.47 | 43 | 2.5 | 1.46 | 3.68 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 83 | 1.6 | 0.01 | 0.01 | 71 | 1.9 | 0.009 | 0.02 | 2/ | 2/ | 2/ | 2/ |
| Chlorpyrifos | 3 | 1.8 | 1.77 | 3.17 | 1/ | 1/ | 1/ | 1/ | 10 | 1.70 | 0.72 | 1.24 |
| Ethion | 17 | 1.3 | 2.74 | 3.61 | 11 | 1.1 | 2.14 | 2.35 | 39 | 1.0 | 5.20 | 5.26 |
| Fenbutatin-oxide | 38 | 1.3 | 1.00 | 1.26 | 15 | 1.6 | 0.96 | 1.50 | 34 | 1.0 | 0.99 | 1.00 |
| Petroleum distillate | 81 | 2.5 | 32.61 | 82.37 | 96 | 2.3 | 32.39 | 74.78 | 2/ | 2/ | 2/ | 2/ |
| Sulfur | 4 | 1.3 | 7.05 | 9.03 | 6 | 1.6 | 19.02 | 30.34 | 2/ | 2/ | 2/ | 2/ |
| Fungicides | | | | | | | | | | | | |
| Basic copper sulfate | 11 | 1.6 | 4.00 | 6.40 | 2 | 1.7 | 1.85 | 3.14 | 9 | 1.6 | 2.31 | 3.85 |
| Benomyl | 10 | 1.6 | 0.88 | 1.43 | 37 | 1.0 | 0.89 | 0.89 | 13 | 1.0 | 0.90 | 0.94 |
| Copper hydroxide | 62 | 2.2 | 2.96 | 6.40 | 68 | 3.3 | 2.71 | 8.98 | 42 | 2.4 | 1.98 | 4.92 |
| Copper oxychlo sul | 5 | 2.4 | 4.33 | 10.37 | 1/ | 1/ | 1/ | 1/ | 33 | 1.9 | 2.99 | 5.87 |
| Ferbam | 1/ | 1/ | 1/ | 1/ | 13 | 1.0 | 10.66 | 10.66 | 15 | 1.0 | 3.35 | 3.42 |
| Other Chemical | | | | | | | | | | | | |
| Gibberellic Acid | 18 | 1.1 | 0.04 | 0.05 | 2 | 1.8 | 0.06 | 0.11 | 1/ | 1/ | 1/ | 1/ |

1/ Insufficient reports to publish. 2/ Not published to avoid disclosure of individual operations in other States.

PECANS: Major Chemical Usage, 1999 Florida 1/

| Chemical | Area applied | Appli-cations | Rate per application | Rate per crop year |
|------------------------|--------------|---------------|----------------------|--------------------|
| | Percent | Number | Pounds per acre | |
| Fertilizer | | | | |
| Nitrogen | 65 | 1.5 | 48 | 73 |
| Phosphate | 46 | 1.2 | 28 | 36 |
| Potash | 58 | 1.3 | 44 | 62 |
| Herbicides | | | | |
| Glyphosate | 31 | 2.2 | 0.46 | 1.02 |
| Insecticides | | | | |
| Chlorpyrifos | 7 | 2.4 | 0.99 | 2.43 |
| Fungicides | | | | |
| Fenbuconazole | 14 | 3.8 | 0.05 | 0.20 |
| Propiconazole | 17 | 2.8 | 0.14 | 0.41 |
| Triphenyltin hydroxide | 31 | 4.6 | 0.25 | 1.18 |

1/ Bearing acres in 1999 for the 7 states surveyed are not available due to the fluctuation in the number of Native and Seedling trees harvested. States included are AZ, CA, FL, NC, SC, and TX. Pecan data were not included in the 1995 and 1997 surveys.

TEMPLES: Major Chemical Usage, 1995, 1997, and 1999 Florida

| Chemical | 1995 (6,800 acres) | | | | 1997 (6,700 acres) | | | | 1999 (6,000 acres) | | | |
|----------------------|--------------------|---------------|------------------------|--------------------|---|---------------|------------------------|--------------------|--------------------|---------------|-----------------------|--------------------|
| | Area applied | Appli-cations | Rate per appli-cat-ion | Rate per crop year | Area applied | Appli-cations | Rate per appli-cat-ion | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | Fertilizer data were not included in the 1997 survey. | | | | | | | |
| Nitrogen | 100 | 2.5 | 62 | 157 | | | | | 100 | 2.7 | 53 | 147 |
| Phosphate | 48 | 3.2 | 13 | 40 | | | | | 80 | 2.2 | 9 | 20 |
| Potash | 95 | 2.4 | 71 | 172 | | | | | 100 | 2.6 | 60 | 158 |
| Herbicides | | | | | | | | | | | | |
| Bromacil | 11 | 1.6 | 1.02 | 1.62 | 11 | 2.0 | 1.28 | 2.52 | 9 | 1.6 | 0.51 | 0.85 |
| Diuron | 36 | 1.3 | 1.44 | 1.93 | 50 | 1.3 | 1.09 | 1.42 | 64 | 2.4 | 1.53 | 3.75 |
| Glyphosate | 97 | 2.4 | 0.78 | 1.91 | 88 | 2.1 | 0.85 | 1.83 | 83 | 1.7 | 0.93 | 1.61 |
| Norflurazon | 10 | 1.9 | 1.64 | 3.18 | 12 | 1.4 | 1.18 | 1.61 | 53 | 1.2 | 1.46 | 1.85 |
| Paraquat | 2 | 2.5 | 0.37 | 0.93 | 1/ | 1/ | 1/ | 1/ | 41 | 2.0 | 0.28 | 0.55 |
| Simazine | 30 | 1.3 | 2.16 | 2.75 | 46 | 1.2 | 1.19 | 1.45 | 26 | 2.4 | 1.55 | 3.86 |
| Insecticides | | | | | | | | | | | | |
| Abamectin | 70 | 1.5 | 0.01 | 0.01 | 58 | 2.7 | 0.009 | 0.02 | 49 | 1.0 | 0.009 | 0.01 |
| Diiflubenzuron | 1/ | 1/ | 1/ | 1/ | 9 | 1.0 | 0.32 | 0.32 | 10 | 1.1 | 0.28 | 0.33 |
| Ethion | 19 | 1.3 | 2.38 | 3.17 | 10 | 1.1 | 2.65 | 3.00 | 30 | 1.0 | 5.32 | 5.51 |
| Fenbutatin-oxide | 9 | 1.2 | 0.93 | 1.09 | 8 | 1.0 | 0.98 | 0.98 | 19 | 1.0 | 1.00 | 1.00 |
| Petroleum distillate | 96 | 2.0 | 33.21 | 65.22 | 98 | 2.2 | 33.58 | 73.26 | 54 | 1.5 | 37.46 | 56.16 |
| Pyridaben | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 12 | 1.0 | 0.31 | 0.31 |
| Sulfur | 11 | 1.5 | 15.03 | 23.28 | 17 | 1.3 | 12.38 | 15.86 | 1/ | 1/ | 1/ | 1/ |
| Fungicides | | | | | | | | | | | | |
| Benomyl | 13 | 1.1 | 1.07 | 1.13 | 38 | 1.1 | 1.06 | 1.20 | 4 | 1.0 | 0.90 | 0.90 |
| Copper hydroxide | 68 | 1.9 | 2.01 | 3.90 | 58 | 3.3 | 2.73 | 9.10 | 37 | 2.1 | 1.67 | 3.64 |
| Felbam | 15 | 1.0 | 4.92 | 4.92 | 34 | 1.0 | 11.23 | 11.23 | 9 | 1.1 | 4.29 | 4.73 |

1/ Insufficient reports to publish.

AVOCADOS: Major Chemical Usage, 1995, 1997 and 1999 Florida

| Chemical | 1995 (5,800 acres) | | | | 1997 (5,700 acres) | | | | 1999 (6,000 acres) | | | |
|----------------------|--------------------|---------------|-----------------------|--------------------|---|---------------|-----------------------|--------------------|--------------------|---------------|-----------------------|--------------------|
| | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year | Area applied | Appli-cations | Rate per appli-cation | Rate per crop year |
| | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | | Percent | Number | Pounds per acre | |
| Fertilizer | | | | | Fertilizer data were not included in the 1997 survey. | | | | | | | |
| Nitrogen | 96 | 3.0 | 56 | 171 | | | | | 99 | 2.7 | 59 | 164 |
| Phosphate | 80 | 3.1 | 22 | 68 | | | | | 98 | 2.5 | 20 | 49 |
| Potash | 96 | 3.0 | 61 | 185 | | | | | 99 | 2.7 | 63 | 175 |
| Herbicides | | | | | | | | | | | | |
| Glyphosate | 77 | 3.9 | 0.70 | 2.70 | 92 | 3.6 | 0.40 | 1.46 | 49 | 4.2 | 0.80 | 3.39 |
| Insecticides | | | | | | | | | | | | |
| Permethrin | 79 | 2.1 | 0.21 | 0.44 | 85 | 1.6 | 0.15 | 0.24 | 46 | 1.9 | 0.15 | 0.29 |
| Petroleum distillate | 42 | 2.0 | 7.00 | 14.00 | 63 | 1.0 | 12.96 | 13.07 | 1/ | 1/ | 1/ | 1/ |
| Fungicides | | | | | | | | | | | | |
| Copper hydroxide | 97 | 5.6 | 5.24 | 29.18 | 90 | 3.6 | 3.89 | 14.14 | 85 | 6.1 | 3.23 | 19.86 |
| Sulfur | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 1/ | 20 | 1.4 | 5.84 | 8.32 |

1/ Insufficient reports to publish.

The following is a list of common names of active ingredients presented in this report along with the associated trade name. FASS does not mean to imply use of any specific trade name.

| COMMON NAME | TRADE NAME |
|----------------------|-----------------------|
| 2, 4-D | Several on the market |
| Abamectin | Agri-Mek |
| Aldicarb | Temik |
| Basic copper sulfate | Top cop, tri-basic |
| Benomyl | Benlate |
| Bromacil | Hyvar |
| Carbaryl | Sevin, Savit |
| Chlorpyrifos | Lorsban |
| Copper hydroxide | Several on the market |
| Copper Sulfate | Copper Sulfate |
| Dicofol | Kelthane |
| Difubenzuron | Dimilin |
| Diuron | Karmex, Direx |
| Ethion | Ethion |
| Ferbam | Carbamate |
| Fenbutatin-oxide | Vendex |
| Fosetyl-al | Aliette |
| Gibberellic Acid | Several on the market |
| Glyphosate | Roundup |
| Iprodione | Rovral |
| Metalaxyl | Ridomil |
| Methidathion | Supracide |
| Norflurazon | Solicam |
| Oryzalin | Surflan |
| Oxythioquinox | Morestan |
| Paraquat | Gramoxone |
| Petroleum Distillate | Several on the market |
| Simazine | Princep |
| Sulfur | Several on the market |

ORANGES: California growers treated a lower percentage of acreage with herbicides, insecticides and fungicides than Florida growers did. California treated 68, 55, and 30 percent of its bearing acreage while Florida treated 97, 94, 79 percent respectively. Glyphosate and Diuron were the most commonly used herbicides. Petroleum distillate and abamectin were the most frequently used insecticides while copper hydroxide was the most widely used fungicide. About 92 percent of the orange acreage in the four states surveyed was treated with nitrogen. Potash was applied to 77 percent of the acreage, followed by phosphate at 61 percent.

GRAPEFRUIT: Pesticides were used less frequently in California than in Florida. Herbicides were used on 69 percent of California's total acreage compared with 97 percent of Florida's bearing acreage. Insecticides were used on 68 percent of the acreage in California and 95 percent of the acreage in Florida. California growers also applied fungicides to a lower percentage of the grapefruit acreage with only 23 percent treated compared to Florida's 96 percent of the bearing acreage. Glyphosate, petroleum distillate, and copper hydroxide were the most commonly used herbicide, insecticide, and fungicide, respectively. About 91 percent of the grapefruit acreage in the four States surveyed received nitrogen applications. Phosphate was applied to 47 percent, while potash was put on 71 percent of the acreage.

LIMES: All of Florida's lime acreage received nitrogen, phosphate and potash applications. Insecticides were applied to 95 percent of the acreage, while fungicides were used on 90 percent of the acres. Herbicides were applied to 42 percent of the lime acreage. Glyphosate, abamectin and copper hydroxide were the most widely applied pesticides.

TANGELOS: Virtually all of Florida's tangelo acreage received fertilizer. Nitrogen and potash were applied to 99 percent of the crop. Phosphate was applied to 70 percent of the bearing acreage. Pesticides were also applied to almost all of the tangelo acres. Insecticides were most commonly used as 98 percent of Florida's bearing acreage was sprayed. Herbicides were also used frequently with 96 percent of the acreage being treated. Fungicides were applied to 87 percent of the crop acreage.

TANGERINES: Nitrogen was applied to 88 percent of the tangerine acreage in the three States surveyed. Virtually all of the Arizona and Florida acreage received nitrogen, while only 57 percent of the California acreage was treated. Phosphate was used on 51 percent of the three-state acreage, with California again the lowest at 31 percent. Nearly all of the Florida tangerine acreage received potash. Herbicides and insecticides were applied to nearly all of Florida's bearing acreage, and fungicides were applied to 85 percent of the bearing acreage. California and Arizona growers applied herbicides to 57 percent and 50 percent of their acreage, respectively. Nearly half of California's acreage received insecticides, and 42 percent was sprayed with fungicides.

TEMPLES: All of the Florida bearing acreage received nitrogen and potash applications. Phosphate was used on 80 percent of the bearing Acreage. Herbicides were applied to nearly all of the bearing acreage in Florida. Insecticides and fungicides were put on 60 and 59 percent of the bearing acres, respectively. Glyphosate, petroleum distillate and copper hydroxide were the most widely used pesticides, by class.

AVOCADOS: Nitrogen fertilizers were used on 93 percent of the acreage, while phosphate and potash fertilizers were used on 50 and 45 percent of the acreage respectively. Herbicides were applied to 49 percent of Florida's bearing acres and 59 percent of California's acreage, Insecticide usage varied from 90 percent of the acreage in Florida to 37 percent in California. Fungicides were used on 97 percent of the Florida acreage but was rarely used in California.

PECANS: Nitrogen was applied to 69 percent of the pecan acreage in the seven states surveyed. Phosphate was used on 47 percent of the acreage, and potash was applied to 45 percent. Insecticides were applied to two-thirds in the seven states surveyed. Fungicides were used on 44 percent and herbicides were used on 44 percent of the acreage in the seven states.

CONCLUSION:

The data collection process for this report required fruit producers to complete a lengthy 31 page questionnaire. This report would not have been possible without their cooperation. To each producer who completed a questionnaire,

THANK YOU

This report is abbreviated from the National release. It was prepared to send to producers who participated in the survey in Florida.

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